ASSESSMENT OF EXPOSURE TO CIGARETTE SMOKE CONSTITUENTS: PILOT STUDY RESULTS FOR CARBON MONOXIDE.

R D Kinser[1], B L Nelson[1], H-J Roethig[1], R-A Walk[1], J Oey[1], A R Tricker[2], D E Leyden[3]. [1]Philip Morris U.S.A., Richmond, VA; [2]Philip Morris Products SA, Neuchatel, Switzerland; [3]Hartfield, VA, USA

This pilot study was conducted to aid in the development of the experimental design for a large study of exposure of adult smokers in the U.S. to selected cigarette smoke constituents. Standard clinical chemistry methods were utilized in all analyses.

The study included 69 adult smokers of any brand of 3.0 – 6.9 mg tar yield (FTC method) manufactured cigarettes and 66 non-smokers. For assessment of exposure levels of carbon monoxide, CO in exhalate and carboxyhemoglobin were measured on weeks 1, 2, 3 and 6 of the six-week pilot study. The average level of CO in the exhalate of smokers ~~over~~ was 25.3 ppm ± 14.4, while that for non-smokers was 5.6 ppm ± 1.8. These differences between smokers and non-smokers are statistically significant ~~with a~~ ($p \leq 0.001$). The mean carboxyhemoglobin levels over the same timeframe were 4.3% ± 2.8 for smokers and 0.6% ± 0.4 for non-smokers (For approximately 50% of the non-smokers the results were < the limit of quantitation (LOQ) (0.3%). These results were omitted from this calculation of the mean.) These differences between smokers and non-smokers are also statistically significant ~~with a~~ ($p \leq 0.001$). At each of the four measurements carboxyhemoglobin levels were statistically significantly higher for female smokers than female non-smokers ($p \leq 0.0000$). The same distinction was obtained for male smokers relative to male non-smokers, also at $p \leq 0.0000$.

For many of the non-smoker measurements of carboxyhemoglobin values below the limit of quantitation were obtained. Statistical calculations were conducted to explore four ways of handling these results: omission of the data from the data set; setting values < LOQ to 0; setting values <LOQ to the LOQ; and setting values <LOQ to O.5LOQ. None of these treatments altered the statistical evaluations reported above.

From these data, we conclude that the carboxyhemoglobin measurement provides an acceptable measure of CO exposure and avoids a sample collection time requirement that would be difficult to achieve in a large study.

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